IN THE CLAIMS

Please amend the claims as follows:

Claims 1-4 (Canceled).

Claim 5 (Currently Amended): A nonlinear process circuit configured to perform a nonlinear transformation of a nonlinear input signal, comprising:

a main circuit configured to form the nonlinear input signal into a first nonlinearly-processed signal using a first function which has an approximate linear characteristic divided into a plurality of intervals; and

an assistant circuit configured to form the first nonlinearly-processed signal into a second nonlinearly-processed signal using a second function which has an approximate linear characteristic in which each of the intervals is divided into two connected line segments,

wherein the main circuit includes

a decision circuit configured to determine a particular interval out of the intervals in which the nonlinear input signal falls;

a signal-generation circuit configured to form the nonlinear input signal into a plurality of first processed signals for each of the intervals;

a plurality of main processing circuits corresponding to respective intervals, each of the main processing circuits configured to multiply the first processed signals inputted into the respective intervals by predetermined coefficients to form second processed signals; and

a first addition circuit configured to add the second processed signals resulting from multiplication processes in the respective intervals, the first addition circuit forming the first nonlinearly-processed signal, and

~~The nonlinear process circuit 1 according to claim 2, wherein~~ the assistant circuit ~~comprises:~~ includes

an assistant storage circuit configured to store a correction amount to be added to the first function, and the assistant circuit is configured to read the correction amount of ~~the~~ a selected interval from the assistant storage circuit, and to form the second function having characteristics in which the correction amount is added to at a midpoint of the selected interval of the first function such that a point at which the correction amount has been added is set as a maximum gain and the correction amount decreases toward start and end points of the selected interval.

Claim 6 (Currently Amended): The nonlinear process circuit according to claim 5, further comprising:

a storage circuit configured to store correction amounts for the respective ~~of the~~ intervals[[;]], wherein the assistant storage circuit is configured to read the correction amount of the selected interval from the storage circuit.

Claim 7 (Currently Amended): A nonlinear process circuit configured to perform a nonlinear transformation of a nonlinear input signal, comprising:

a main circuit configured to form the nonlinear input signal into a first nonlinearly-processed signal using a first function which has an approximate linear characteristic divided into a plurality of intervals;

a storage circuit configured to store predetermined coefficients; and

an assistant circuit configured to form the first nonlinearly-processed signal into a second nonlinearly-processed signal using a second function which has an approximate linear characteristic in which each of the intervals is divided into two connected line segments,

wherein the main circuit includes

a decision circuit configured to determine a particular interval out of the intervals in which the nonlinear input signal falls;

a signal-generation circuit configured to form the nonlinear input signal into a plurality of first processed signals for each of the intervals;

a plurality of main processing circuits corresponding to respective intervals, each of the main processing circuits configured to multiply the first processed signals inputted into the respective intervals by predetermined coefficients to form second processed signals; and

a first addition circuit configured to add the second processed signals resulting from multiplication processes in the respective intervals, the first addition circuit forming the first nonlinearly-processed signal, and

~~The nonlinear process circuit according to claim 3, wherein~~ the assistant circuit ~~comprises~~ includes

an assistant storage circuit configured to store a correction amount to be added to the first function and a direction value indicating a direction in which the correction amount is to be added, and the assistant circuit is configured to read the correction amount for the selected interval from the assistant storage circuit, and to add the correction amount to a midpoint of the selected interval of the first function in a direction of the direction value read from the assistant storage circuit to form the second function having characteristics in which a point at which the correction amount has been added is set as a maximum gain and in which the correction amount decreases toward start and end points of the selected interval.

Claim 8 (Currently Amended): The nonlinear process circuit according to claim 7, further comprising:

a storage circuit storing correction amounts and direction values for the respective ~~of the~~ intervals[[;]], wherein the assistant storage circuit is configured to read the correction amount and the direction value of the selected interval from the storage circuit.

Claims 9-13 (Canceled).

Claim 14 (Currently Amended): ~~The method according to claim 12, wherein step (b) comprises:~~ A method for performing a nonlinear transformation of a nonlinear input signal, comprising:

forming the nonlinear input signal into a first nonlinearly-processed signal using a first function which has an approximate linear characteristic divided into a plurality of intervals;

converting the first nonlinearly-processed signal into a second nonlinearly-processed signal using a second function wherein the plurality of intervals have an approximate linear characteristic divided into two connected line segments, by

reading from a memory, which stores gain correction amounts for the respective ~~of the~~ approximate linear characteristic of the plurality of intervals of the first function, a stored gain correction amount corresponding to the approximate linear characteristic of ~~said~~ a particular interval[[;]], and

adding a correction value derived using the second function to the first nonlinearly-processed signal, ~~forming the second function~~ by adding to a midpoint of said particular interval the read gain correction amount to set a point at which the

second function in the particular interval has a maximum gain over the first function in the particular interval.

Claim 15 (Currently Amended): ~~The method according to claim 12, wherein step (b) comprises:~~ A method for performing a nonlinear transformation of a nonlinear input signal, comprising:

forming the nonlinear input signal into a first nonlinearly-processed signal using a first function which has an approximate linear characteristic divided into a plurality of intervals;

converting the first nonlinearly-processed signal into a second nonlinearly-processed signal using a second function wherein the plurality of intervals have an approximate linear characteristic divided into two connected line segments, by

reading from a memory, which stores gain correction amounts and respective correction directions for the respective ~~of the~~ approximate linear characteristic of the plurality of intervals of the first function, a stored gain correction amount and correction direction corresponding to the approximate linear characteristic of ~~said~~ a particular interval[[;]], and

adding a correction value derived using the second function to the first nonlinearly-processed signal, ~~forming the second function~~ by adding to a midpoint of said particular interval the read gain correction amount in the read correction direction to set a point at which the second function in the particular interval has a maximum gain over the first function in the particular interval.

Claim 16 (Currently Amended): ~~The method according to claim 13, wherein step (b) comprises:~~ A method for performing a nonlinear transformation of a nonlinear input signal, comprising:

forming the nonlinear input signal into a first nonlinearly-processed signal using a first function which has an approximate linear characteristic divided into a plurality of intervals, by

determining a particular interval in which the nonlinear input signal falls,

forming the nonlinear input signal into a plurality of first processed signals for respective intervals,

multiplying the first processed signals by predetermined coefficients to form second processed signals, and

adding the second processed signals to form the first nonlinearly-processed signal; and

converting the first nonlinearly-processed signal into a second nonlinearly-processed signal using a second function wherein a plurality of the intervals have an approximate linear characteristic divided into two connected line segments, by

reading from a memory, which stores gain correction amounts for the respective ~~of the~~ approximate linear characteristic of the plurality of intervals of the first function, a stored gain correction amount corresponding to the approximate linear characteristic of ~~said~~ a particular interval[[;]], and

adding a correction value derived using the second function to the first nonlinearly-processed signal, ~~forming the second function~~ by adding to a midpoint of said particular interval the read gain correction amount to set a point at which the second function in the particular interval has a maximum gain over the first function in the particular interval.

to set a point at which the second function in the particular interval has a maximum gain over the first function in the particular interval.

Claim 18-27 (Canceled).

Claim 17 (Currently Amended): ~~The method according to claim 13, wherein step (b) comprises:~~ A method for performing a nonlinear transformation of a nonlinear input signal, comprising:

forming the nonlinear input signal into a first nonlinearly-processed signal using a first function which has an approximate linear characteristic divided into a plurality of intervals, by

determining a particular interval in which the nonlinear input signal falls,

forming the nonlinear input signal into a plurality of first processed signals for respective intervals,

multiplying the first processed signals by predetermined coefficients to form second processed signals, and

adding the second processed signals to form the first nonlinearly-processed signal; and

converting the first nonlinearly-processed signal into a second nonlinearly-processed signal using a second function wherein a plurality of the intervals have an approximate linear characteristic divided into two connected line segments, by

reading from a memory, which stores gain correction amounts and respective correction directions for the respective ~~of the~~ approximate linear characteristic of the plurality of intervals of the first function, a stored gain correction amount and correction direction corresponding to the approximate linear characteristic of ~~said~~ a particular interval[[;]], and

adding a correction value derived using the second function to the first nonlinearly-processed signal, ~~forming the second function~~ by adding to a midpoint of said particular interval the read gain correction amount in the read correction direction